

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number 038190/239642

(filed with the Notice of Appeal)

Application Number 09/975,168

Filed October 11, 2001

First Named Inventor Thomas L. Weaver et al.

Art Unit 2633

Examiner Nathan M. Curs

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s):

Remarks five (5) pages.

Note: No more than five (5) pages may be provided.

Respectfully submitted,



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REMARKS

This communication is filed in response to the final Official Action of January 11, 2006. Initially, Applicants would like to thank the Examiner for taking the time to conduct a telephone interview regarding the final Official Action. The final Official Action continues to reject all of the pending claims, namely Claims 1-26, under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,717,795 to Sharma et al., in view of the publication S.V. Kartalopoulos, *Introduction to DWDM Technology: Data in a Rainbow*, IEEE Press 41, 42 (2000), alone or further in view of U.S. Patent No. 4,089,584 to Polczynski. As explained below, Applicants respectfully submit that the claimed invention of the present application is patentably distinct from Sharma, Kartalopoulos and Polczynski, taken individually or in combination. In view of the remarks presented herein, Applicants respectfully request reconsideration and reversal of the rejections to the claims.

In contrast to the system of independent Claim 1, and as conceded by the first, second and now final Official Action, Sharma does not disclose a multimode network bus. Nonetheless, the final Official Action alleges that, as Sharma discloses the use of a multimode light source, it would have been obvious to have used the multimode light source in conjunction with the other features of the system of Claim 1 since multimode light sources are less expensive than single-mode light sources. Further, the final Official Action alleges that Kartalopoulos discloses a multimode optical fiber and that such a fiber has advantages over single-mode optical fiber in splicing and light coupling. Thus, the final Official Action alleges that it would have been further obvious to one skilled in the art to implement a multimode fiber, as disclosed by Kartalopoulos, in the system disclosed by Sharma, to disclose the claimed invention.

A. Multimode of Sharma Differs from Multimode of Claimed Invention

Briefly, and as explained more fully in response to the first and second Official Actions, multimode as the term is used to describe the light source in Sharma differs from multimode as the term is used to describe the multimode network bus, as understood by those skilled in the art. Generally, Sharma discloses a multimode light source. As explained below, however, a multimode light source such as that disclosed by Sharma does not require a multimode network

bus, such as that recited by the claimed invention. In this regard, as is well understood by those skilled in the art, modes of a light source as disclosed by Sharma differ from the modes of a network bus as recited by the claimed invention. Accordingly, a multimode light source such as that disclosed by Sharma can equally provide optical signals to a single-mode network bus or a multimode network bus.

Even considering Sharma to disclose a multimode light source, Sharma does not disclose a multimode bus. And in view of the above, as the multimode light source of Sharma operates in multiple longitudinal modes, the multimode light source could equally provide optical signals to a single mode network bus or a multimode network bus such that the multimode light source of Sharma does not also suggest the user of a multimode network bus as set forth by independent Claim 1.

B. Single-Mode Fibers in Telecommunications Systems

As indicated above, Sharma does not explicitly define its network bus as being single mode or multimode. Nonetheless, Sharma does suggest that its network bus is, in fact, a single mode network bus, in contrast to the multimode network bus of independent Claim 1. In this regard, Sharma discloses the use of related network systems being proposed for optical telecommunication. As is well known to those skilled in the art, due to increased modal dispersion in multimode waveguides, optical telecommunication networks are most typically, if not exclusively, implemented using single mode waveguides. Moreover, as shown and described with respect to FIGS. 8, 9 and 10 of Sharma, the network nodes of various embodiments of the Sharma system include optical circulators (see, e.g., optical circulators **618, 6111** of FIG. 8). And as is also well known to those skilled in the art, optical circulators are primarily used with single mode waveguides.

As explained in response to the second Official Action and during the telephone interview, Applicants respectfully submit that the totality of the prior art suggests that the use of multimode fibers in telecommunications systems is contrary to accepted wisdom in the art. As disclosed in column 1, lines 40-45 of U.S. Patent No. 4,776,655 to Robertson, for example, the majority of optical fiber used in telecommunications as of 1985 (i.e., the foreign priority filing

date of the Robertson patent) was monomode (i.e., single mode) optical fiber. In this regard, one of the principle problems with the use of multimode optical fibers for telecommunications is the limit modal dispersion imposes on the information carrying capacity of such fibers. *See* U.S. Patent No. 3,957,343 to Dyott et al., column 1, lines 18-21 (foreign priority filing date of 1972). As explained in U.S. Patent No. 5,011,247 to Boudreau et al. (filed 1990), “[m]any telecommunications applications use single-mode optical fiber because of the superior bandwidth arising from its reduction of mode partition noise.... Multimode optical fiber is of little value for telecommunications because it suffers from mode-partition noise when used for high speed transmissions over a distance.” Column 1, lines 37-46. *See also* U.S. Patent No. 4,957,342 (column 1, lines 46-62) and 5,024,504 (column 1, lines 36-51) both to Boudreau et al. (and further explaining that technology for aligning multimode optical fibers in an array is not acceptable for telecommunications).

In the final Official Action and during the telephone interview, the Examiner cited Kartalopoulos as disclosing multimode fibers having a bandwidth of up to 100 Mbps for lengths up to 40 km, and asserted that this disclosure supported the use of multimode fiber in telecommunications systems. To the contrary, however, Applicants respectfully submit that merely citing bandwidth and length capabilities of multimode fiber does not itself support their use in telecommunications systems, particularly without comparison to corresponding bandwidth and length characteristics of telecommunications systems.

Also during the telephone interview, the Examiner explained that the aforementioned prior art references cited by Applicants were given little weight by the Examiner in demonstrating the preferred and typical use of single-mode fiber in telecommunications systems due to the relative age of those references as compared to Kartalopoulos. Accordingly, Applicants draw further attention to U.S. Patent No. 6,334,019 to Birks et al. (filed 1999), U.S. Patent No. 7,031,612 to Liou et al. (filed 2001), and U.S. Patent No. 6,754,423 to Simons et al. (filed 2001). Consistent with the prior art previously cited by Applicants, Birks explains that single-mode fibers are advantageous over multimode fibers in telecommunication systems due to their avoiding the problem of intermodal dispersion suffered by multimode fibers. Column 1, line 58 – column 2, line 2. Liou explains that although a LAN (local area network) may be either

multimode or single mode, fiber for long distance applications such as telecommunications applications must be single-mode fiber. And Simons explains that single mode fibers are mainly applied in the field of telecommunications due to their low attenuation and dispersion characteristics. Column 1, lines 22-39. Further, and with respect to the Examiner's assertion of multimode fibers spanning 40 km supports their use in telecommunications, Simons explains that such long-distance links often span many thousands of kilometers, in contrast to the 40 km length given by Kartalopoulos. *Id.* at lines 29-31.

Applicants again respectfully submit that, considering the totality of the prior art, the use of multimode optical fiber in telecommunications systems is contrary to accepted wisdom in the art. As the Sharma system is disclosed with reference to telecommunications systems, Sharma thereby suggests its network bus is a single-mode network bus, as opposed to a multimode network bus, as in the claimed invention.

C. Combination of Sharma/Kartalopoulos

Even if it could be asserted (albeit incorrectly) that Sharma does not teach or suggest a particular type of optical fiber, the second Official Action alleges that Kartalopoulos discloses multimode fiber, and that it would have been obvious to one skilled in the art to combine the teachings of Kartalopoulos with Sharma to disclose the claimed invention. Applicants respectfully submit, however, that one skilled in the art would not be motivated to modify Sharma to include the multimode fiber of Kartalopoulos. In this regard, as explained above, the Sharma system is disclosed with reference to telecommunications systems, and the use of multimode fiber in telecommunications systems is contrary to accepted wisdom in the art. Sharma therefore teaches away from the use of multimode fiber, such as that disclosed by Kartalopoulos, in the disclosed telecommunication system. *See* MPEP § 2145 X.D.2. (explaining that "[i]t is improper to combine references where the references teach away from their combination").

As motivation for including the multimode fiber of Kartalopoulos in the system of Sharma and Kartalopoulos, the final Official Action explains that multimode fiber is easier to easier to splice and couple light into, as compared to single-mode fiber. Applicants respectfully

submit, however, that even considering the general benefit of multimode fiber over single-mode fiber, finding a motivation to combine references requires weighing all of the benefits, both lost and gained, of combining references. *Winner Int'l Royalty Corp. v. Ching-Rong Wang*, 202 F.3d 1340, 1349 & n.8 (Fed. Cir. 2000). In this regard, a motivation to combine requires finding what, on balance, is desirable as opposed to what is feasible. *Id.* In the instant case, the benefits of multimode fiber over single-mode fiber proffered by the Examiner exist by virtue of their construction and have existed since the user of fiber optics in telecommunications. Yet as demonstrated by the aforementioned references cited by Applicants, telecommunication systems still predominately, if not exclusively, employ single-mode fiber. And as such, Applicants respectfully submit that, at least in so far as the telecommunications industry has implemented fiber optics, on balance, one skilled in the art would not be motivated to include the multimode fiber of Kartalopoulos in the telecommunications system of Sharma due to the ease of splicing and light coupling of multimode fiber.

Similar to Sharma and Kartalopoulos, Applicants further respectfully submit that Polczynski does not teach or suggest the aforementioned closed-loop network system with a multimode network bus for transmitting optical signals. Applicants therefore respectfully submit that independent Claim 1, and by dependency Claims 2-6, is patentably distinct from Sharma, Kartalopoulos and Polczynski, taken individually or in any proper combination. Applicants also respectfully submit that independent Claims 7, 12 and 21 recite subject matter similar to that of independent Claim 1, including the aforementioned closed-loop network system with a multimode network bus for transmitting optical signals. Thus, Applicants also respectfully submit that the independent Claims 7, 12 and 21, and by dependency Claims 8-11, 13-20 and 22-26, are also patentably distinct from Sharma, Kartalopoulos and Polczynski, taken individually or in any proper combination, for at least the same reasons given above with respect to independent Claim 1. Applicants further respectfully request, then, that the rejection of Claims 1-26, under 35 U.S.C. § 103(a) as being unpatentable over Sharma in view of Kartalopoulos, alone or further in view of Polczynski, be reversed.